Patent Claims

1. A process for producing a component from an alloy which can be hardened by precipitations, with the machineability and/or weldability being improved in an intermediate step by an improvement heat treatment carried out on the component prior to welding and/or machining, this improvement heat treatment coarsening the precipitations, thereby improving the welding and/or machineability, and the improvement heat treatment at least in part being carried out during slow cooling at a cooling rate of 2° to 3°C/min.

2. The process as claimed in claim 1, characterized in that an overaging heat treatment is carried out as the improvement heat treatment on the component in order to coarsen the precipitations.

3. The process as claimed in claim 1 or 2, characterized in that a further heat treatment is carried out after the welding and/or machining, so that the microstructure which is set in this way for the areas of use of the component has better properties than without this heat treatment.

4. The process as claimed in claim 1, 2 or 3, characterized in that a subsequent heat treatment, which at least partially reverses the coarsening of the precipitations, is carried out after the welding and/or machining.

5. The process as claimed in claim 1, characterized in that to produce the component the component is cast from a melt of the alloy.

6. The process as claimed in claim 1, 2, 3, 4 or 5, characterized in that the component is re-densified.

7. The process as claimed in claim 1, 2 or 6, characterized in that the component is re-densified prior to the improvement heat treatment.

8. The process as claimed in claim 1 or 2, characterized in that the component is heated up to a set temperature, and in that the improvement heat treatment takes place at least in part through slow cooling.

9. The process as claimed in claim 6 or 7, characterized in that the improvement heat treatment takes place immediately after the re-densification.

10. The process as claimed in claim 5, characterized in that the improvement heat treatment is carried out immediately after casting.

11. The process as claimed in claim 6, 7 or 9, characterized in that the re-densification is carried out by means of hot isostatic pressing.

12. The process as claimed in claim 1 or 5, characterized in that the alloy used is an iron-base, nickel-base or cobalt-base superalloy.

13. The process as claimed in claim 12, characterized in that the alloy includes the γ' phase.

14. The process as claimed in claim 1, 3 or 4, characterized in that a weld filler of a similar analysis to the base metal is used for the welding.

15. The process as claimed in claim 1, 3 or 4, characterized in that a weld filler which is of the same composition as the alloy is used for the welding.

16. The process as claimed in claim 1, 3, 4, 14 or 15, characterized in that a weld filler which can be hardened by a precipitation is used for the welding.

17. The process as claimed in claim 1, 3, 4, 14, 15 or 16, characterized in that a weld location is formed during the welding, and in that the at least one weld location is hammered.

18. The process as claimed in claim 1 or 5, characterized in that the alloy used is the material IN 738LC or IN 939.

19. The process as claimed in claim 1 or 2, characterized in that for the improvement heat treatment the component is held at a temperature, and in that then the component is cooled.

20. The process as claimed in claim 1, 2 or 19, characterized in that the improvement heat treatment takes place at least at a solution-annealing temperature of the alloy.

21. The process as claimed in claim 1, 2, 19 or 20, characterized in that the overaging heat treatment takes place at 1180°C.

22. The process as claimed in claim 4, characterized in that the subsequent heat treatment for at least partially reversing the coarse precipitations is carried out at least in part at a solution-annealing temperature.

23. The process as claimed in claim 4 or 22, characterized in that the subsequent heat treatment for at least partially reversing the coarse precipitations is carried out at least in part during cooling at a cooling rate

of from 20°C to 40°C per minute.

24. The process as claimed in claim 16, characterized in that the precipitations of the weld filler form at least 35% by volume.

25. The process as claimed in claim 6, characterized in that the temperature for the re-densification is below the solidus line of the material of the component.